

## **A GOOD PRACTICE GUIDE FOR DIVING IN COZUMEL, MEXICO: A SHORT TERM ALTERNATIVE FOR CORAL REEF CONSERVATION**

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### **INTRODUCTION**

Chapter 17th of Agenda 21 points out the importance of establishing limits in the use of coral reefs (UN 1992). Following this proposal many marine protected area (MPA) management programs promote the need to establish carrying capacities for different activities, including diving.

There are close to 600 MPAs with coral reefs around the world (Spalding, 2001). In the Caribbean there are nearly 300 marine and coastal protected areas and in 70% of them conservation goals are not totally successful, due to non sustainable tourist practices including diving. (ICRAN 2004)

From an economic viewpoint diving is an important and growing leisure activity in 91 countries. For example, in ten years (from 1985 to 1995) the number of divers that visited the Great Barrier in Australia jumped from 1.1 to 10 million (Spalding 2001). Every year 1.5 million persons are certified as divers (ENS 2004). Over 60% of international diving tourists visit Caribbean coral reefs and it is expected that in 2005 diving will produce earnings of 1.2 billion dollars for Caribbean countries (Hof 2001).

Cozumel's MPA was established in 1996 when it already was an important tourist destination for divers. In spite of the fact that establishing a carrying capacity for divers is a priority in Cozumel's MPA management program, the monthly number of visitors to the most popular reefs goes far beyond the figures that most experts consider a diving site must not exceed in a year.

Furthermore, the higher numbers of one day visitors to Cozumel, mainly cruise ship passengers, is increasing the number of divers with little experience that have higher rates of physical contacts –i.e. stress- with the coral reef. Increasing pressures and lack of political will to limit the number of divers in Cozumel's MPA gave rise to the question: What can be done, under present conditions, to improve the chance of conservation for Cozumel's coral reefs?

### **BACKGROUND**

Within the framework of sustainable tourism a common proposal to protect natural resources from anthropogenic impacts is to establish the carrying capacity of each specific ecosystem (Echemendi 2001). Different studies of diving impacts in coral reefs

coincide in a figure of 5000 – 6000 divers per year as the carrying capacity of a diving site (Hof 2001).

Cozumel's MPA is visited by an average 1500 divers per day (Jordan 2003) that dive one or up to three times doing deep, shallow and / or night dives. Close to 35% of deep dives are done at Santa Rosa reef, which is closely followed in preference by Palancar and Colombia reefs. Of shallow dives 50% concentrate in Tormentos and Yucab reefs. Another heavily visited reef is Paraiso that accounts for 15% of shallow dives and almost 100% of night dives.

Cozumel is an island south of Cancun, it has a population close to 80,000 and its economy is totally dependent on tourism. In Cozumel alone there are more than 100 registered diving shops that have from 1 to over 10 boats and are a significant source of income and employment. Diving is the main activity for overnight stay tourists that visit the island and there is no doubt that a limit on the number of divers allowed per day is a controversial issue in the local agenda.

With the creation of the MPA an important set of measures with positive impacts in coral reefs conservation were introduced. A no- anchoring policy and new controls for operation, maintenance, disposal of sewage and garbage helped with a better performance by boats. In addition, regulations for divers include a no-contact and no feeding policy, environmental awareness briefings, buoyancy refreshers, no gloves nor knives allowed, and maximum numbers of divers that an instructor or guide can lead.

Nonetheless the high number of visitors has a negative effect in the health, biological richness and beauty of Cozumel's coral reefs. At present the MPA authorities have plans to elaborate a new management program without being committed to establishing a limit in the number of divers that can have access to the marine park. Therefore, at the University of Quintana Roo we decided to carry out a research project to propose a short term strategy that could improve protection for coral reefs, mainly through a Good Practice Guide for Diving.

## **METHODS**

Data on 86 diving groups and 321 divers were collected between November 2003 and August 2004. The groups observed were not a random sample but those in which the diving shops that supported us had spare places on the dates we had proposed beforehand. Boat crews, instructors and diving guides knew we were recording divers' behaviour, physical contacts and suspended sediment, but treated us as any other tourist. Divers were selected at random and observed discretely avoiding changes in their behaviour.

Single divers were observed during periods of 10 minutes, taking note of every contact or sediment they remove. Data on the part of body or equipment involved were recorded as well as the type of reef (wall or plateau) and its main features (depth, current, diving difficulty). Divers experience, gender and age group were recorded as well.

While observing and recording information of single divers, the rest of the group was observed at glance taking note of the size, the activities of the instructor or guide and if some circumstances or conditions were related to a sudden increase in the number of physical contacts and sediment removal.

In collaboration with the staff of the MPA we are now participating in obligatory training workshops for crews, instructors and dive masters that apply for permits to operate within the park. Our participation is to make them aware of the impact on the reef caused by bad practice in guiding divers' groups. For a second stage, new workshops are planned to discuss with instructors and dive masters which good practices should be included in a Guide and what is the time frame necessary for their instrumentation. The direct participation of these local actors aims to promote a new conservation approach with social support that can make new policies such as establishing limits to the numbers of divers allowed in the MPA easier in the future

## RESULTS

Data collected during the observation of 321 divers in 86 groups showed that:

- The average number of contacts and/or sediment removal was of 3.9 per 10 minutes periods. A typical dive lasts from 30 to 35 minutes at the reef plus descent and ascent time. Therefore in the groups observed the average number of impacts per diver in one dive is 12.6.
- Of all divers 61% (196) had contacts and or removed sediment.
- In the case of divers with cameras 69% had contacts and or removed sediment.
- A small number of divers (39) were responsible for almost 50% of all direct contacts, and a smaller number (26) accounted for 48% of total events of sediment removal.
- Direct contacts took place more often than sediments removal, at a rate of 10 to 4.3.
- Both in direct contacts and sediment removal fins were the equipment or body part that accounted for most of them (42% in the former, 77.3% for the latter), followed by gauges (19.5% and 12.4%).
- Air tanks represented 10.6% of total direct impacts and close to zero in cases of removal of sediment.
- In wall reefs air tanks were the cause of 40.8% of total contacts, after fins, and followed by gauges (15.9%) and legs (8.6%).
- In plateau reefs the second cause of impacts were gauges (25.3%), and the third one were hands (12.4%).

The analysis of these data, under the framework of the results from the observation of group management by the instructors and dive masters pointed out that a very high percentage of impacts on the coral reef are directly related to bad practices or omissions:

- Buoyancy refreshers were not mandatory for divers.

- Environmental awareness briefings prior to dives were skipped by some instructors and dive masters.
- Still and video photographers did not receive special instructions in spite of the fact that as a category they had a 9% higher percentage of impacts than average.
- The few divers with very high impacts rates either were not identified or did not received specific signs or messages. Just 12% of divers produced almost 50% of total direct contacts. Such divers were evenly distributed by divers experience and age group, though most of them were men.
- No indications were given to divers before or during the dive regarding loose gauges. Over 17% of contacts and removal of sediment were caused by loose gauges.
- Against expectations average impacts were higher in wall reefs than in plateau reefs, mainly due to the high number of contacts with air tanks and legs when divers were led into caves, canyons and narrow spaces. Air tanks and legs combined reached 24.5% of total direct impacts in wall reefs.
- The higher the numbers of persons in a group, the higher the group impacts average was.
- The stronger the current was, the higher the percentage of direct contacts in total impacts.
- When dive masters and instructors pointed out small hidden animals a large number of impacts took place, unless divers were instructed to get close one by one.
- Some guides and instructors dive too close to the reef and their behaviour is followed by some divers.
- When two or more groups of divers encountered each other, no rules applied and divers stopped, got into a horizontal position, crowded each other and experienced a high rate of impacts on the reef.
- Given the economic importance that divers' tips had for crews, instructors and dive masters, some of them avoided leadership in good environmental practices and/or gave most of their attention to specific people, rather than keeping track of environmentally sound skills and practices.
- Most instructors and dive masters did not have scientific and precise information about Cozumel's coral reefs ecosystems that would have helped them enhance the tourist experience of divers through shared knowledge.

## MANAGEMENT IMPLICATIONS

Carrying capacity is elastic. Therefore if the average number of impacts is reduced, a coral reef could have a larger carrying capacity. Tackling bad practices and omissions by diving leaders can reduce damage to the coral reef. The management of impacts by substituting bad practices for good ones is a short term alternative for coral reef conservation.

It must be said that such a strategy doesn't mean that limits to the number of divers are not necessary. The proposal of the Good Practice Guide is a short term alternative for the

mitigation of negative impacts but it is not a sound and definitive solution for coral reef conservation.

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